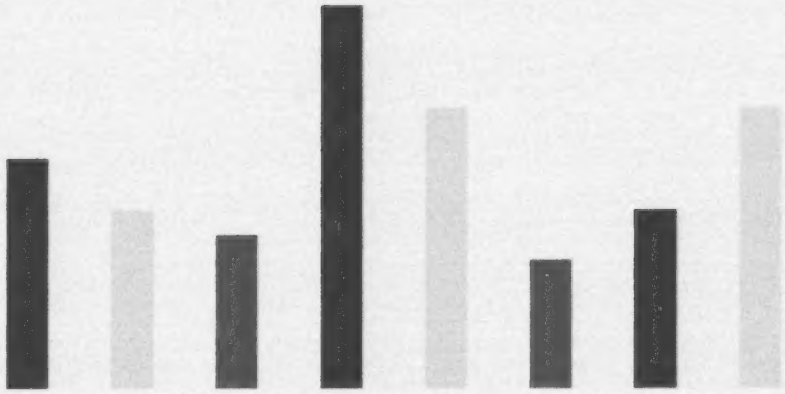
Transportation Safety Board of Canada

Bureau de la sécurité des transports du Canada

Statistical Summary Pipeline Occurrences 2013



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FOREWORD

This document provides Canadians with an annual summary of selected pipeline safety data. It covers federally regulated pipelines only. Non-federally regulated data reported to the TSB are not included in this report. The TSB gathers and uses this data during the course of our investigations to analyse safety deficiencies and identify risks in the Canadian transportation system.

The 2013 data were collected according to the reporting requirements described in the TSB Regulations in force during that calendar year. On March 12, 2014, the TSB issued new regulations that change the reporting requirements effective July 1, 2014. These changes will be reflected only in the 2014 Statistical Summary.

Information in this summary is also posted on the Transportation Safety Board of Canada (TSB) Internet site at www.bst-tsb.gc.ca.

Users of these statistics are advised that, in a live database, the occurrence data are constantly being updated. Consequently, the statistics may change slightly over time. Further, as many occurrences are not formally investigated, information recorded for some occurrences will not have been verified. Therefore, caution should be used when using these statistics. The 2013 statistics presented in this document reflect the TSB database as of 5 February 2014.

To enhance awareness and increase the safety value of the material presented in this document, readers are permitted to copy or reprint in whole, or in part, for further distribution (with acknowledgement of the source).

The TSB is an independent agency operating under its own Act of Parliament. Its sole aim is the advancement of transportation safety.

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TABLE OF CONTENTS

ACCIDENTS 1

INCIDENTS 3

APPENDICES 5

Appendix A: Pipeline occurrence tables 5
Appendix B: Definitions 9

FIGURES

Figure 1. Number of accidents and accident rate (accidents per exajoule) 1
Figure 2. Percentage of accidents by facility type, 2004–2013 2
Figure 3. Percentage of accidents by quantity of release, 2004–2013 2
Figure 4. Number of pipeline incidents, 2004–2013 3
Figure 5. Percentage of incidents by quantity of release, 2013 4
Figure 6. Percentage of incidents by facility type, 2013 4

TABLES

Table 1. Pipeline accidents and incidents by type, 2004–2013 5
Table 2. Pipeline activity and accident rate, 2004–2013 6
Table 3. Pipeline accidents and incidents by province, 2004–2013 6
Table 4. Pipeline accidents and incidents by facility type, 2004–2013 7
Table 5. Pipeline accidents and incidents with release, by product type, 2004–2013 8
Table 6. Pipeline accidents and incidents by quantity released, 2004–2013 8

PIPELINE OCCURRENCES IN 2013

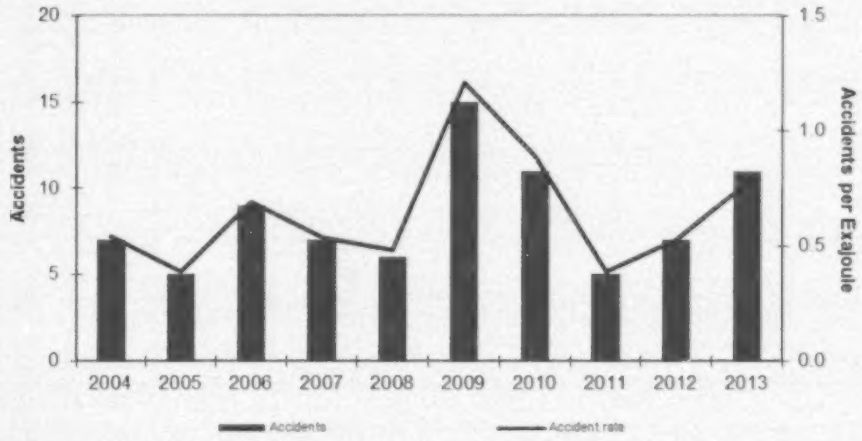
In 2013, in the federally-regulated pipeline system, 25 companies transported 207 million cubic metres of oil (1.3 billion barrels) along 19,090 kilometres of active oil lines. Sixty-six companies, including 11 that also transport oil, transported 163 billion cubic metres of natural gas (5.8 trillion cubic feet) along 55,972 kilometres of active natural gas lines.[1]

ACCIDENTS

Eleven pipeline accidents[2] (Table 1) were reported to the TSB in 2013, up from a total of 7 in 2012, and up from the annual average of 9 in the previous 5 year period (2008–2012).

Pipeline activity increased 7% from 2012[3]. An indicator of pipeline transportation safety in Canada is the pipeline accident rate. The 2013 rate (Table 2) was 0.8 pipeline accidents per exajoule[4], up from 0.5 in 2012, and up from the annual average of 0.7 in 2008–2012 (Figure 1).

Figure 1. Number of accidents and accident rate (accidents per exajoule)



Source: NEB (estimated)

Location of accidents: Over the 10 year period (2004–2013), 46% of pipeline accidents (Table 4) occurred at compressor stations and gas processing plants, and 23% occurred on transmission lines (Figure 2). The remaining pipeline accidents (31%) occurred on pump stations, meter stations, gathering lines, and other facility types.

In 2013, 2 pipeline accidents involved line pipe, and 9 pipeline accidents occurred at facilities: 4 at compressor stations, 2 at gas processing plants, 1 at a pump station, 1 at a terminal, and 1 at a transmission line pig trap.

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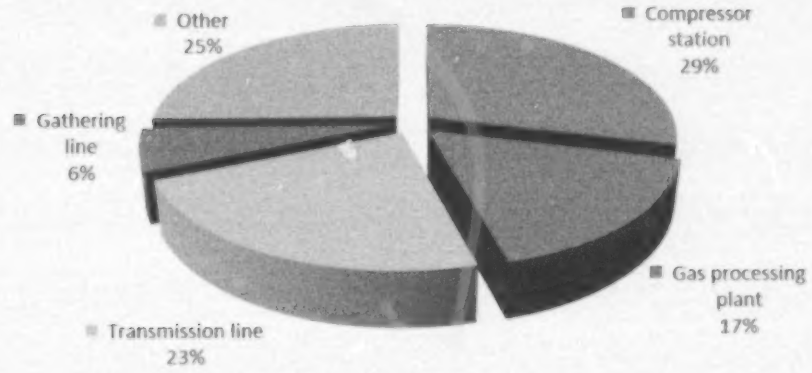
1 Data regarding the size of the federally regulated pipeline system, the number of companies, and the transported product volumes were provided by the National Energy Board (NEB).

2 Refer to Appendix B for a definition of a reportable pipeline accident.

3 Pipeline activity is provided by the National Energy Board (NEB).

4 One exajoule = 10^{18} joules (A joule is a unit of work or energy equal to the work done by a force of one newton acting through a distance of one metre.)

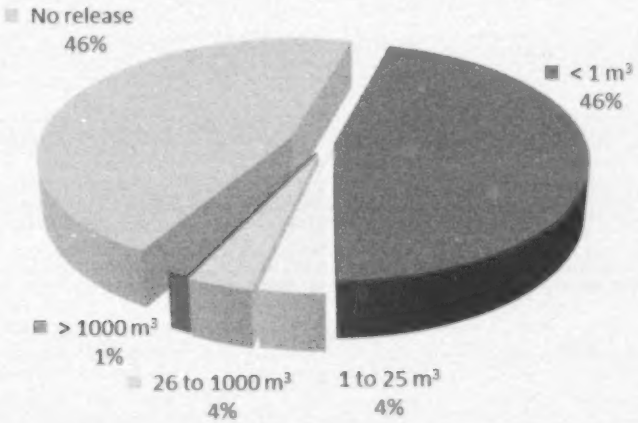
Figure 2. Percentage of accidents by facility type, 2004–2013



Fatalities: The last fatal accident on a federally-regulated pipeline system occurred in 1988.

Release of product: Over the 2004-2013 period, 45 of the 83 accidents (Tables 5 & 6, Figure 3) resulted in a release of product. Natural gas was released in 19 accidents, with all releases being less than 1 cubic metre[5]. Crude oil was released in 14 accidents, with 8 releases of less than 1 cubic metre (6.29 barrels (bbl)), 2 releases between 1 and 25 cubic metres (between 6.29 barrels and 157 bbl), 3 releases between 26 and 1,000 cubic metres (between 158 and 6290 bbl), and 1 release over 1,000 cubic metres (6290 bbl).

Figure 3. Percentage of accidents by quantity of release, 2004–2013



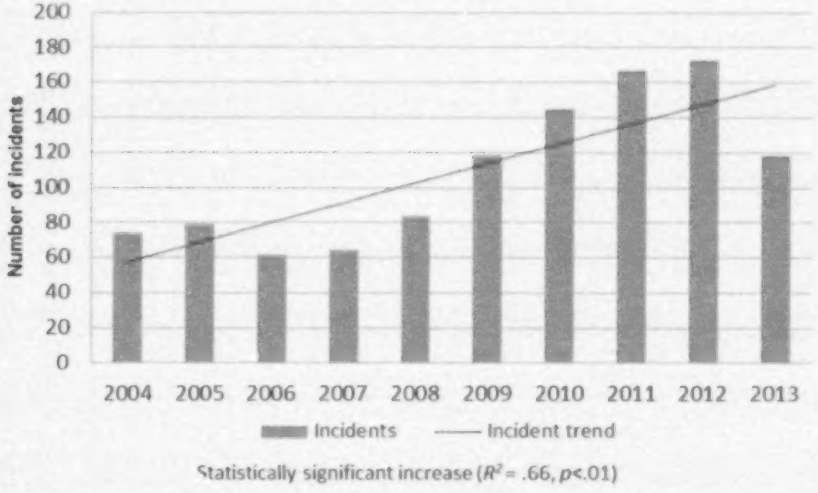
[5] One cubic metre equals 35.3 cubic feet, or 6.29 barrels.

INCIDENTS

In 2013, 118 pipeline incidents[6] (Table 1) were reported to the TSB, down from 173 in 2012 and down from the annual average of 137 in 2008-2012. This decrease is entirely accounted for by small releases (less than 1 cubic meter) at facilities, which decreased from 135 incidents (78% of all incidents) in 2012 to 76 incidents (64% of all incidents) in 2013.

The decreasing trend may in part be accounted for by the decrease in the number of minor incidents for pipeline facilities that had recently been started up or converted (e.g., from a gas pipeline to an oil pipeline). In general, after an initial start-up phase, the number of minor incidents will decrease and stabilize. The TSB will continue to examine these and other potential factors relating to the trends for minor pipeline incidents.

Figure 4. Number of pipeline incidents, 2004–2013



Statistically significant increase (R^2 = .66, p<.01)

Location of incidents: In 2013, 25% of pipeline incidents (Table 4) occurred on transmission lines, followed by 16% each at terminals, meter stations, and pump stations, and 13% at compressor stations. The remaining 14% occurred at gas processing plants, on gathering lines, at an injection/delivery facility, or at other facilities (Figure 5).

Release of product: In 2013, 78% of the total incidents (Tables 1 and 6) involved a release of less than 1 cubic metre of gas, oil or other petroleum product, and 16% involved no release of product. Four incidents involved a release of 1 to 25 cubic metres (between 6.29 and 157 bbl) of crude oil, and 1 involved a release of 1 to 25 cubic metres (between 6.29 and 157 bbl) of lube oil. One incident involved a release of 26 to 1,000 cubic meters (1,000 m^3) of natural gas, and one involved a release of over 1,000 cubic meters (5,700 m^3) of natural gas (Figure 6).

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6 Refer to Appendix B for a definition of a reportable pipeline incident.

Figure 6. Percentage of incidents by facility type, 2013

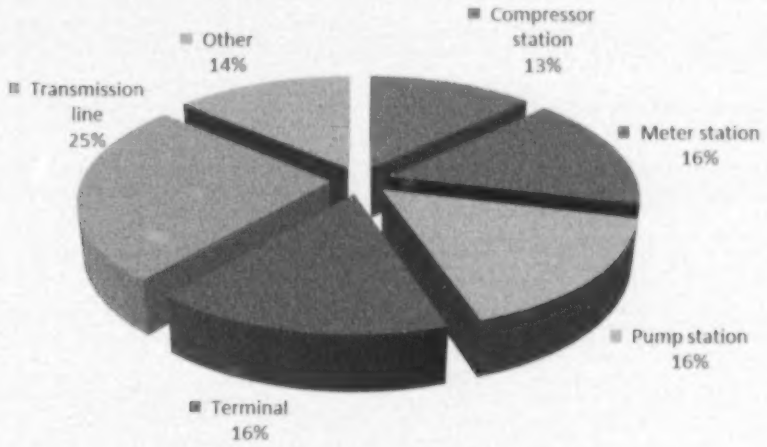
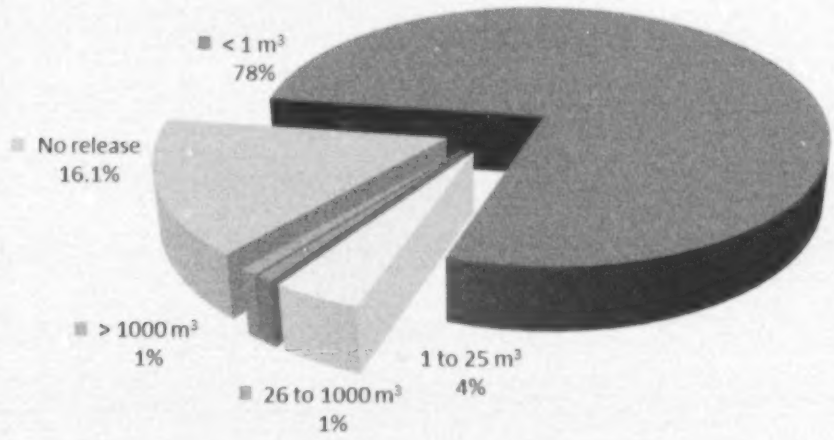


Figure 5. Percentage of incidents by quantity of release, 2013



Crude oil releases of less than 1 cubic metre (less than 6.29 barrels) decreased from 75 in 2012 (49% of all releases) to 28 in 2013 (28% of all releases), and natural gas releases of less than 1 cubic metre decreased from 59 in 2012 (38% of all releases) to 43 in 2013 (43% of all releases).

APPENDICES

Appendix A: Pipeline occurrence tables

Table 1

Pipeline accidents and incidents by type
2004-2013

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Accidents	7	5	9	7	6	15	11	5	7	11
Total, line pipe	0	2	1	2	0	6	1	2	1	2
3rd party damage with release	0	1	1	1	0	0	0	0	0	0
Disturbance of supporting environment with release	0	0	0	0	0	0	0	0	0	0
Corrosion/Environmental cracking	0	0	0	0	0	0	0	1	0	0
Fire/Ignition/Explosion	0	1	0	0	0	3	0	1	1	2
Other damage with release	0	0	0	1	0	3	1	0	0	0
Total, other facilities (a)	7	3	8	5	6	9	10	3	6	9
3rd party damage	0	0	1	1	1	1	2	1	1	1
Corrosion/Environmental cracking	0	0	0	0	0	0	0	0	0	0
Fire/Ignition/Explosion	6	3	6	4	4	7	6	2	5	8
Other damage with release	1	0	1	0	1	1	2	0	0	0
Accidents with a release of product	5	3	2	3	3	8	8	4	3	6
Accidents with casualties	0	0	1	0	0	1	0	0	1	0
Accidents with environmental damage	0	0	0	1	0	1	0	1	1	0
Accidents with a fire	4	3	5	4	4	11	6	3	6	8
Accidents with an explosion	0	0	1	0	0	1	0	1	1	0
Incidents	74	79	62	64	84	118	145	167	173	118
Total, line pipe	25	21	11	14	13	20	16	18	18	21
3rd party damage no release	1	0	3	2	3	5	2	1	3	1
Disturbance of supporting environment no release	0	3	0	1	0	1	0	2	2	1
Uncontained release	16	17	5	9	5	9	7	12	12	15
Other	8	1	3	2	5	5	7	3	1	4
Total, other facilities	49	58	51	50	71	98	129	149	155	97
3rd party damage no release	0	0	0	0	2	1	0	0	1	2
Uncontained release	45	54	51	45	61	86	119	125	140	83
Other	4	4	0	5	8	11	10	24	14	12
Incidents with a release of product	66	71	56	55	69	96	129	147	154	99
Incidents with environmental damage	1	0	1	0	0	1	0	0	1	0
Incidents with a fire	0	0	1	1	5	0	1	9	6	1
Incidents with an explosion	1	0	0	0	0	1	0	0	0	0

Data extracted February 05, 2014.

Federally regulated pipeline occurrences.

In 2009, there was a 38% increase in the size of the federally regulated pipeline system when an additional 23 705 kilometres of pipeline and associated facilities were transferred from provincial jurisdiction.

Table 2

Pipeline activity and accident rate
2004-2013

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Accidents	7	5	9	7	6	15	11	5	7	11
Natural gas products (exajoules)	6.5	6.6	6.6	6.5	6.2	5.9	5.6	5.6	5.3	6.1
Petrolium products (exajoules)	6.5	6.3	6.5	6.6	6.3	6.5	6.8	7.3	8.0	8.1
Total (exajoules)	13.0	12.9	13.1	13.1	12.5	12.4	12.4	12.9	13.3	14.2
Number of accidents per exajoule	0.54	0.39	0.69	0.53	0.48	1.21	0.89	0.39	0.53	0.77

Data extracted February 05, 2014.
Federally regulated pipeline occurrences.
Source: National Energy Board (estimated).
One exajoule = 10^{18} joules (A joule is a unit of work or energy equal to the work done by a force of one newton acting through a distance of one metre.)

Table 3

Pipeline accidents and incidents by province
2004-2013

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Accidents	7	5	9	7	6	15	11	5	7	11
Newfoundland and Labrador	0	0	0	0	0	0	0	0	0	0
Prince Edward Island	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	0	0	0	0	0	0	0	0	0
New Brunswick	0	0	0	0	0	0	0	0	0	0
Quebec	0	0	0	0	0	0	0	0	0	0
Ontario	0	1	1	2	1	5	2	2	2	2
Manitoba	0	0	2	1	1	0	1	0	0	0
Saskatchewan	0	1	0	1	0	2	1	1	1	1
Alberta	0	1	1	0	0	4	4	1	2	6
British Columbia	7	2	5	3	4	4	3	0	2	2
Yukon	0	0	0	0	0	0	0	0	0	0
Northwest Territories	0	0	0	0	0	0	0	1	0	0
Nunavut	0	0	0	0	0	0	0	0	0	0
Incidents	74	79	62	64	84	118	145	167	173	118
Newfoundland and Labrador	0	0	0	0	0	0	0	0	0	0
Prince Edward Island	0	0	0	0	0	0	0	0	0	0
Nova Scotia	0	1	1	2	1	0	1	5	2	3
New Brunswick	0	0	0	1	0	5	6	14	19	16
Quebec	3	4	1	3	2	4	2	2	1	1
Ontario	11	7	7	8	17	20	19	22	22	10
Manitoba	6	3	7	4	10	9	14	11	10	12
Saskatchewan	11	23	14	10	17	13	38	35	45	18
Alberta	9	21	11	11	16	36	51	55	45	35
British Columbia	32	16	20	23	19	26	13	11	18	17
Yukon	0	0	0	0	0	0	0	0	0	0
Northwest Territories	2	4	1	2	2	5	1	12	11	6
Nunavut	0	0	0	0	0	0	0	0	0	0

Data extracted February 05, 2014.
Federally regulated pipeline occurrences.

Table 4

Pipeline accidents and incidents by facility type
2004-2013

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Accidents	**7**	**5**	**9**	**7**	**6**	**15**	**11**	**5**	**7**	**11**
Compressor station	1	0	4	2	2	3	5	0	3	4
Gathering line	1	0	0	1	0	1	1	0	1	0
Injection/Delivery facility	0	0	0	0	0	0	0	0	0	0
Meter station	0	0	1	0	1	0	1	2	1	0
Gas processing plant	5	1	1	0	2	3	0	0	0	2
Pump station	0	1	1	1	0	1	1	0	2	1
Storage facility	0	0	0	0	0	0	0	0	0	0
Terminal	0	1	1	0	1	0	2	1	0	1
Transmission line	0	2	1	3	0	7	1	2	0	3
Other	0	0	0	0	0	0	0	0	0	0
Incidents	**74**	**79**	**62**	**64**	**84**	**118**	**145**	**167**	**173**	**118**
Compressor station	4	10	8	8	20	32	26	22	31	15
Gathering line	7	8	5	5	5	9	7	7	8	2
Injection/Delivery facility	0	0	0	0	0	0	1	1	0	1
Meter station	0	0	1	5	2	13	21	20	17	19
Gas processing plant	20	7	9	4	8	8	5	3	6	11
Pump station	16	27	18	15	20	26	30	48	37	19
Storage facility	0	0	0	0	1	0	0	1	1	0
Terminal	7	11	8	11	10	13	21	27	35	19
Transmission line	16	13	12	14	17	16	32	31	33	30
Other	4	3	1	2	1	1	2	7	5	2

Data extracted February 05, 2014.

Federally regulated pipeline occurrences.

Table 5

Pipeline accidents and incidents with release, by product type
2004-2013

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Accidents	**5**	**3**	**2**	**3**	**3**	**8**	**8**	**4**	**3**	**6**
Condensate	1	0	0	0	0	0	0	0	0	0
Liquified petroleum gas	0	0	0	0	1	0	0	0	0	0
Natural gas	0	1	1	1	0	5	3	2	2	4
Natural gas liquids	0	0	0	0	0	0	0	0	0	0
Petroleum crude oil	0	1	1	2	1	1	4	2	0	2
Refined products	0	0	0	0	0	1	0	0	0	0
Sour gas	1	0	0	0	0	1	0	0	1	0
Well effluent	0	0	0	0	0	0	0	0	0	0
Sour condensate	0	0	0	0	0	0	0	0	0	0
Sour crude oil	0	0	0	0	0	0	0	0	0	0
Acid gas	0	0	0	0	0	0	0	0	0	0
Other	3	1	0	0	1	0	1	0	0	0
Incidents	**66**	**71**	**56**	**55**	**69**	**96**	**129**	**147**	**154**	**99**
Condensate	3	0	1	0	1	1	2	0	0	3
Liquified petroleum gas	0	1	1	0	1	1	2	1	1	0
Natural gas	14	16	14	19	26	37	55	59	63	45
Natural gas liquids	3	5	1	0	0	0	0	4	1	5
Petroleum crude oil	22	38	24	24	28	32	54	71	77	31
Refined products	0	1	2	1	1	2	4	0	2	0
Sour gas	9	5	3	5	1	7	2	2	4	2
Well effluent	0	0	0	0	0	0	0	0	0	0
Sour condensate	0	0	0	0	0	0	0	0	0	0
Sour crude oil	0	0	0	0	0	0	0	0	0	1
Acid gas	2	2	0	1	1	0	0	1	0	1
Other	13	3	10	5	10	16	10	9	6	11

Data extracted February 05, 2014.

Federally regulated pipeline occurrences.

Table 6

Pipeline accidents and incidents by quantity released
2004-2013

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Accidents	**5**	**3**	**2**	**3**	**3**	**8**	**8**	**4**	**3**	**6**
Less than 1 cubic metre	5	2	1	1	2	7	8	3	3	6
1 to 25 cubic metres	0	1	1	0	1	0	0	0	0	0
26 to 1000 cubic metres	0	0	0	2	0	0	0	1	0	0
Greater than 1000 cubic metres	0	0	0	0	0	1	0	0	0	0
Incidents	**66**	**71**	**56**	**55**	**69**	**96**	**129**	**147**	**154**	**99**
Less than 1 cubic metre	48	56	47	44	53	87	119	124	147	92
1 to 25 cubic metres	8	9	4	7	13	5	5	13	4	5
26 to 1000 cubic metres	2	4	5	2	3	3	5	5	3	1
Greater than 1000 cubic metres	8	2	0	2	0	1	0	5	0	1

Data extracted February 05, 2014.

Federally regulated pipeline occurrences.

Appendix B: Definitions

The following definitions apply to pipeline occurrences that are required to be reported pursuant to the Canadian Transportation Accident Investigation and Safety Board Act and the associated regulations in effect in 2013.

Pipeline
A pipeline that is used for the transportation of commodities and includes all branches, extensions, pumps, racks, compressors, loading facilities, storage facilities, reservoirs, tanks, preparation plants, separation plants, interstation systems of communication and property and works connected therewith.

Pipeline occurrence
(a) Any accident or incident associated with the operation of a pipeline, and
(b) Any situation or condition that the Board has reasonable grounds to believe could, if left unattended, induce an accident or incident referred to in paragraph (*a*);

Reportable commodity pipeline accident
An accident resulting directly from the operation of a commodity pipeline, where:
(a) a person sustains a serious injury or is killed as a result of being exposed to
  (i) a fire, ignition or explosion, or
  (ii) a commodity released from the commodity pipeline, or
(b) the commodity pipeline
  (i) sustains damage affecting the safe operation of the commodity pipeline as a result of being contacted by another object or as a result of a disturbance of its supporting environment,
  (ii) causes or sustains an explosion, or a fire or ignition that is not associated with normal operating circumstances, or
  (iii) sustains damage resulting in the release of any commodity;

Reportable commodity pipeline incident
An incident resulting directly from the operation of a commodity pipeline, where:
(a) an uncontained and uncontrolled release of a commodity occurs,
(b) the commodity pipeline is operated beyond design limits,
(c) the commodity pipeline causes an obstruction to a ship or to a surface vehicle owing to a disturbance of its supporting environment,
(d) any abnormality reduces the structural integrity of the commodity pipeline below design limits,
(e) any activity in the immediate vicinity of the commodity pipeline poses a threat to the structural integrity of the commodity pipeline, or
(f) the commodity pipeline, or a portion thereof, sustains a precautionary or emergency shut-down for reasons that relate to or create a hazard to the safe transportation of a commodity;

Serious injury
An injury that is likely to require admission to a hospital.